National Institute of Environmental Health Sciences

Weather, water quality and infectious gastrointestinal illness in two inuit communities in Nunatsiavut, Canada: Potential implications for climate change

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Abstract:

Climate change is expected to cause changes in precipitation quantity, intensity, frequency and duration, which will subsequently alter environmental conditions and might increase the risk of waterborne disease. The objective of this study was to describe the seasonality of and explore associations between weather, water quality and occurrence of infectious gastrointestinal illnesses (IGI) in two communities in Nunatsiavut, Canada. Weather data were obtained from meteorological stations in Nain (2005-2008) and Rigolet (2008). Free-chlorine residual levels in drinking water were extracted from municipal records (2005-2008). Raw surface water was tested weekly for total coliform and E. coli counts. Daily counts of IGI-related clinic visits were obtained from health clinic registries (2005-2008). Analysis of weather and health variables included seasonal-trend decomposition procedures based on Loess. Multivariable zero-inflated Poisson regression was used to examine potential associations between weather events (considering 0-4 week lag periods) and IGI-related clinic visits. In Nain, water volume input (rainfall + snowmelt) peaked in spring and summer and was positively associated with levels of raw water bacteriological variables. The number of IGI-related clinic visits peaked in the summer and fall months. Significant positive associations were observed between high levels of water volume input 2 and 4 weeks prior, and IGI-related clinic visits ($P < 0.05$). This study is the first to systematically gather, analyse and compare baseline data on weather, water quality and health in Nunatsiavut, and illustrates the need for high quality temporal baseline information to allow for detection of future impacts of climate change on regional Inuit human and environmental health.

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Resource Description

Communication:

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience:

audience to whom the resource is directed

Public

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Quality

Food/Water Quality: Pathogen

Geographic Feature:

resource focuses on specific type of geography

Freshwater

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Non-U.S. North America

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Foodborne/Waterborne Disease

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern:

populations at particular risk or vulnerability to climate change impacts

Elderly, Racial/Ethnic Subgroup

Other Racial/Ethnic Subgroup: Inuit

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content